

# DiTAH - a Project to Expand Digital Skills, Methods and Infrastructure in Humanities Research and Teaching

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## DiTAH

<https://www.ditah.at>



<https://cima.or.at>

The aim of the DiTAH-project (Digital Transformation for Austrian Humanities) funded by the Austrian Federal Ministry of Education, Science and Research is to establish and process the methods and approaches developed in the Digital Humanities in such a way that they can be transferred to everyday use in humanities research and the education of students and scholars.

Three major subject areas are considered: integration of the digital infrastructure, preparation and low-threshold access to digital methods and tools, and the promotion of digital skills in science and teaching. Within the project, the interdisciplinary investigation of historical manuscripts generates a variety of measurement and descriptive data: these range from multi- and hyperspectral images to spectroscopic material analyses, codicological and restoration descriptions, to transcriptions and philological editions.

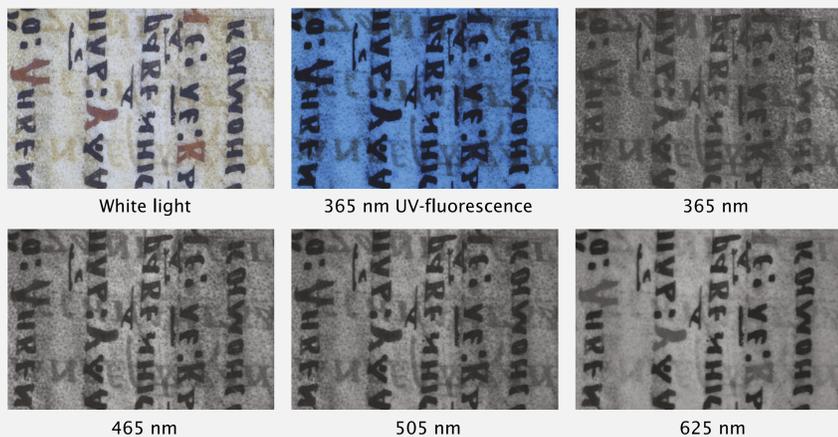
As part of the DiTAH-project, a repository for archiving and disseminating this diversity of data in the form of multimodal manuscript representations is being developed.

The data material that has been produced continuously for years as part of the research work of the Vienna Centre of Image and Material Analysis in Cultural Heritage (CIMA) is used as a concrete application. The resulting repository is intended for further use of the data in technical, scientific and humanities research, as well as for university teaching (technical methods and data sources in the humanities).

## MSI – HSI (Multi- and Hyperspectral Imaging)

MSI – subset of narrow spectral ranges (UV-Vis-NIR)

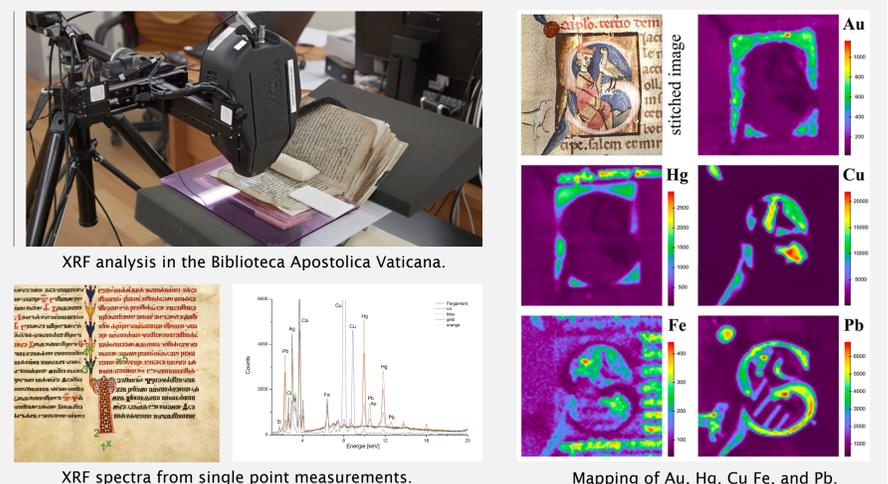
HSI – contiguous ranges of wavelengths in steps of 1-5 nm (UV-Vis-NIR)



Multispectral images of a palimpsest. The spectral signatures at the particular ranges allow to differentiate various text layers.

## XRF (X-Ray Fluorescence Analysis)

Elemental analysis of the support, text and decorations (e.g. parchment, paper, inks, pigments, etc.): Single point and elemental mapping.



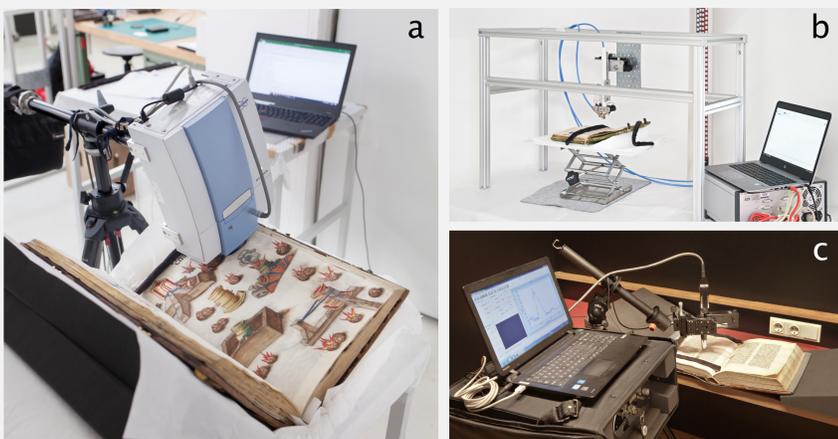
XRF analysis in the Biblioteca Apostolica Vaticana.

XRF spectra from single point measurements.

Mapping of Au, Hg, Cu Fe, and Pb.

## FTIR, UV/Vis/NIR and Raman Spectroscopy

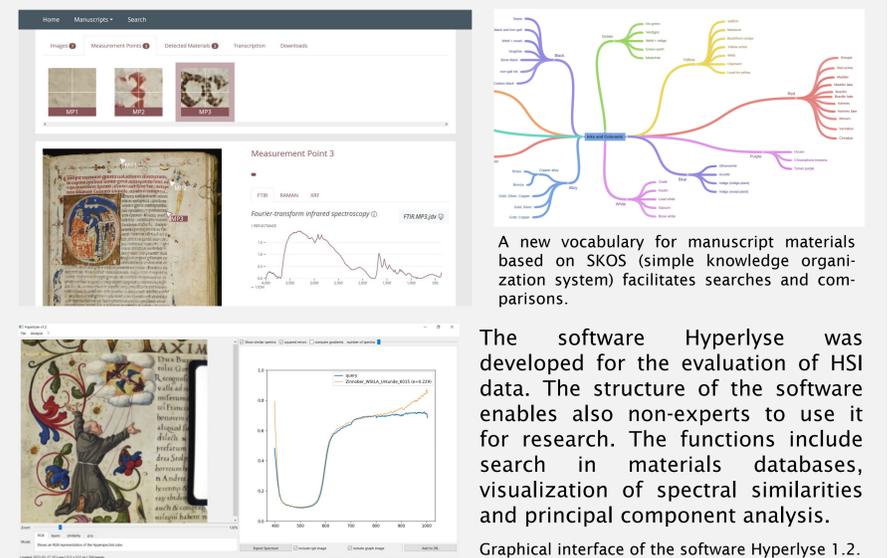
Compound specific analysis of organic and inorganic materials (e.g. pigments, inks, supports, binders, contaminations, remains from conservation treatments, etc.) due to absorption of mid-infrared (FTIR), UV, visual and near-infrared (UV/Vis/NIR), and scattering of LASER radiation (Raman).



Compound specific analyses of manuscripts by FTIR (a), UV/Vis/NIR (b) and Raman Spectroscopy (c). Variable mounting options for the instruments are available in order to meet the specific requirements for the analyzed objects.

## Repository and data evaluation tools

Public access to the analytical data is provided via a repository in which all data of the project partners – including the humanities – are gathered.



A new vocabulary for manuscript materials based on SKOS (simple knowledge organization system) facilitates searches and comparisons.

The software Hyperlyse was developed for the evaluation of HSI data. The structure of the software enables also non-experts to use it for research. The functions include search in materials databases, visualization of spectral similarities and principal component analysis.

Graphical interface of the software Hyperlyse 1.2.

## Conclusion

Non-destructive documentation in the visible and invisible spectral ranges and material characterization provide multimodal representations of heritage objects. Public accessibility of the data and smart evaluation tools enable transdisciplinary research and improved teaching.

## Perspectives

Multi-disciplinary manuscript research data is disseminated in the form of coherent digital objects, both via a web viewer and technical interfaces. With regard to Linked Open Data, particular value is placed on the use of established standards (IIIF, METS, TEI, SKOS).

## References:

Vetter W, Frühmann B, Cappa F, Schreiner M: Materials and techniques used for the "Vienna Moamin": multianalytical investigation of a book about hunting with falcons from the thirteenth century. *Herit Sci* 9, 87 (2021). <https://doi.org/10.1186/s40494-021-00553-w>  
Frühmann, B., Cappa, F., Vetter, W. et al. Multianalytical approach for the analysis of the Codices Millenarius Maior and Millenarius Minor in Kremsmuenster Abbey, Upper Austria. *Herit Sci* 6, 10 (2018). <https://doi.org/10.1186/s40494-018-0176-3>